

<b>Candidate Name</b>	<b>Class</b>	<b>Register Number</b>
-----------------------	--------------	------------------------



## CHANGKAT CHANGI SECONDARY SCHOOL

### Mid Year Examination 2011

---

**Subject** : Physics  
**Paper No.** : 5058 / 01  
**Level** : Secondary 3 Express  
**Date** : 16 May 2011  
**Duration** : 1 hour  
**Setter** : Mr Kenny Low

---

#### INSTRUCTIONS TO CANDIDATES

**Do not open this booklet until you are told to do so.**

Write your name, class and register number in the spaces at the top of this page.

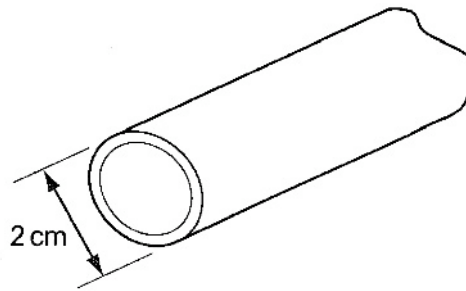
#### **MUTIPLE CHOICE QUESTIONS [40 MARKS]**

Answer all questions. Shade the correct answer in pencil on the OTAS sheet provided.

<b>For Examiners' Use</b>	<b>Marks</b>
Paper 1	/ 40
Expected Grade	Actual Grade
Parent's / Guardian's signature	

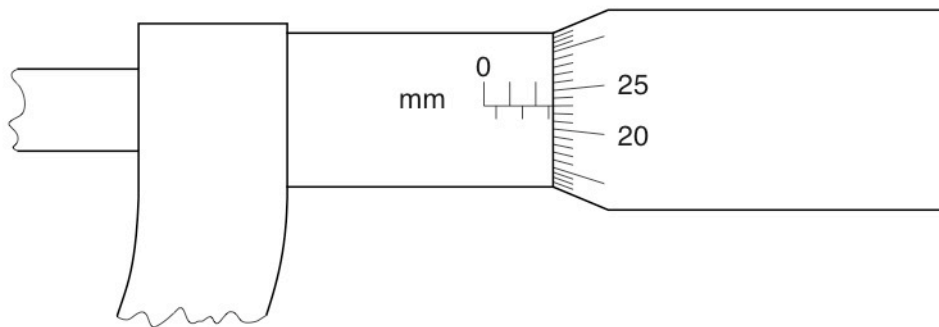
Answer all questions. Shade the correct answer in pencil on the OTAS sheet provided.

- 1 A length of copper pipe, of uniform cross-section and several metres long, carries water to a tap.



Which instruments are used to take measurements to calculate accurately the volume of copper in the pipe?

- A Calipers and micrometer
  - B Micrometer and rule
  - C Rule and tape
  - D Tape and calipers
- 2 The diagram below shows a micrometer.



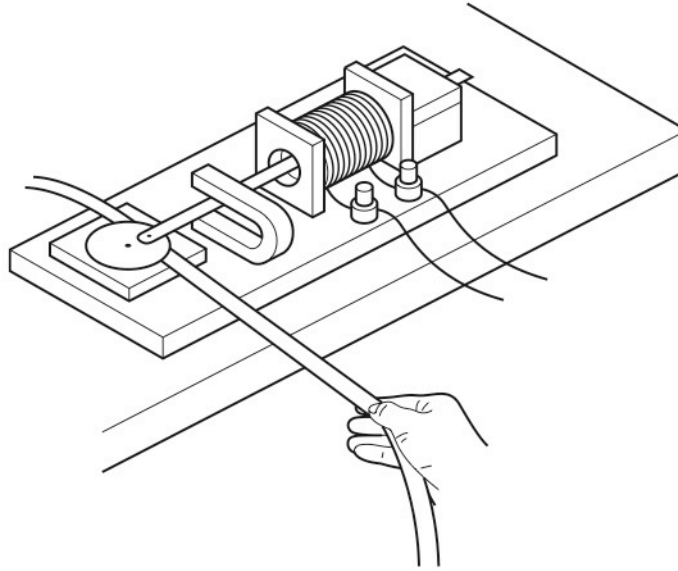
What is the reading on the micrometer?

- A 2.23 mm
  - B 2.73 mm
  - C 5.23 mm
  - D 4.73 mm
- 3 A pair of vernier calipers is used to measure the diameter of a piece of wire.
- Which of the following could be the diameter of the wire?
- A 3.3 cm
  - B 3.31 cm
  - C 3.310 cm
  - D 3.312 cm

- 4 Which one of the following correctly classifies a scalar and a vector quantity?

	Scalar	Vector
A	Mass	Density
B	Weight	Density
C	Mass	Weight
D	Weight	Mass

- 5 Chew Yu pulls a piece of tape through a ticker-tape timer. Every 0.02 s, the timer prints a dot on the tape.



Chew Yu pulls the tape quickly, then slowly, then quickly again.

Which piece of tape did she obtain?

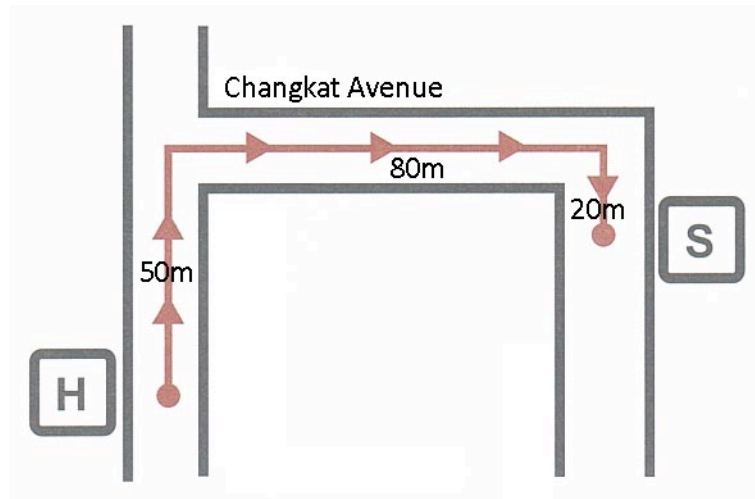
A

B

C

D

- 6 Grace walks from home to school every day via the following route.

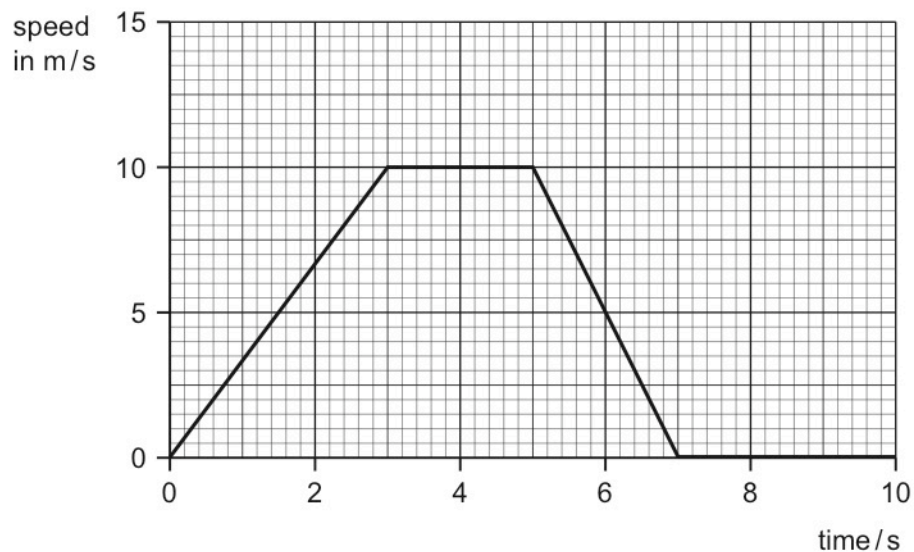


She leaves home at 7.10 am and reaches school at 7.13 am. What is her average speed?

- A 0.83 m/s      B 50 m/s      C 11.5 m/s      D 0.56 m/s

**REFER TO THE FOLLOWING DIAGRAM FOR QUESTIONS 7 AND 8**

The graph shows the speed of a car over the first ten seconds of its journey.



- 7 Which of the following statements about the acceleration of the car between 3 and 5 s is true?

- A The acceleration increases.  
 B The acceleration is constant.  
 C The acceleration is zero.  
 D The acceleration is 10 m/s.

- 8 What is the distance traveled by the car during the 10 s?

- A 35 m      B 45 m      C 70 m      D 100 m

- 9 Sand was dropped from a stationary hot-air balloon at a height of 200 metres. Which statement best describes the fall of the sand to the ground?

**A** The speed increases uniformly all the way.  
**B** The speed increases and then remains constant.  
**C** The speed remains constant all the way.  
**D** The speed decreases and then remains constant.

- 10 A cyclist riding at a speed of 5 m/s braked with uniform deceleration and stopped in 3 m. How long did she take to stop?

**A** 0.6 s                      **B** 1.2 s                      **C** 1.33 s                      **D** 3.0 s

- 11 How is the motion of a body affected by balanced and unbalanced forces acting on it?

	Balanced Forces	Unbalanced Forces
<b>A</b>	Velocity changes	Velocity changes
<b>B</b>	Velocity changes	Velocity constant
<b>C</b>	Velocity constant	Velocity changes
<b>D</b>	Velocity constant	Velocity constant

- 12 When his parachute is fully open, a parachutist falls towards the ground at a constant speed.

Under these conditions, which statement is correct?

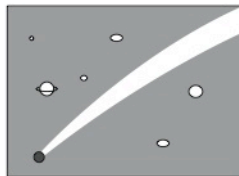
**A** There are no forces acting on the parachutist.  
**B** The upward force on the parachutist is greater than the weight of the parachutist.  
**C** The upward force on the parachutist is equal to the weight of the parachutist.  
**D** The upward force on the parachutist is less than the weight of the parachutist.

- 13 The diagrams show some effects which are all due to the same cause.

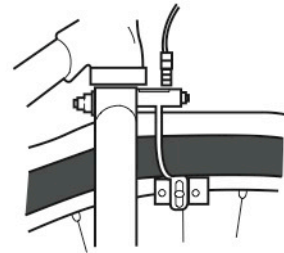
a parachutist  
reaching terminal velocity



a meteor glowing as it  
falls through the  
atmosphere



brakes slowing down  
a bicycle



What causes these effects?

**A** Friction                      **B** Heat                      **C** Mass                      **D** Weight

- 14 A sledge of mass 25 kg is pulled across level ground with a horizontal force of 60 N. The constant force of friction is 20 N. What is the acceleration of the sledge?

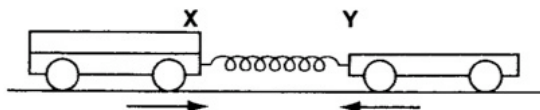
**A** 0.63 m/s<sup>2</sup>                      **B** 1.6 m/s<sup>2</sup>                      **C** 2.4 m/s<sup>2</sup>                      **D** 3.2 m/s<sup>2</sup>

- 15** When a block of wood of mass 2 kg was pushed along the horizontal flat surface of a bench, the frictional force measured was 4 N.

Which of the following statements describes the motion of the block when it is pushed with a force of 10 N?

- A** It moves with a constant speed of 3 m/s.
- B** It moves with a constant speed of 5 m/s.
- C** It moves with a constant acceleration of 3 m/s<sup>2</sup>.
- D** It moves with a constant acceleration of 5 m/s<sup>2</sup>.

- 16** Trolley **X** and trolley **Y** are joined by a stretched spring. Trolley **X** has twice the mass of trolley **Y**.



When the trolleys are released, the acceleration of **X** is 2 m/s<sup>2</sup> to the right. What is the initial acceleration of trolley **Y** to the left?

- A** 1 m/s<sup>2</sup>                      **B** 2 m/s<sup>2</sup>                      **C** 3 m/s<sup>2</sup>                      **D** 4 m/s<sup>2</sup>
- 17** Two forces of magnitudes 10 N and 12 N are acting on an object. Which of the following gives the possible range of the resultant force, **F<sub>R</sub>**, acting on the object?
- A**  $10 \leq F_R \leq 12$               **B**  $2 \leq F_R \leq 12$               **C**  $10 \leq F_R \leq 22$               **D**  $2 \leq F_R \leq 22$

- 18** The acceleration of free fall on the Moon is 1.6 m/s<sup>2</sup>. The acceleration of free fall on the Earth is 10 m/s<sup>2</sup>. A rock has a mass of 10 kg on the Earth. Which statement about the rock is correct?

- A** Its mass on the Moon is 1.6 kg.
- B** Its mass on the Moon is 10 kg.
- C** Its weight on the Moon is zero.
- D** Its weight on the Earth is 10 N.

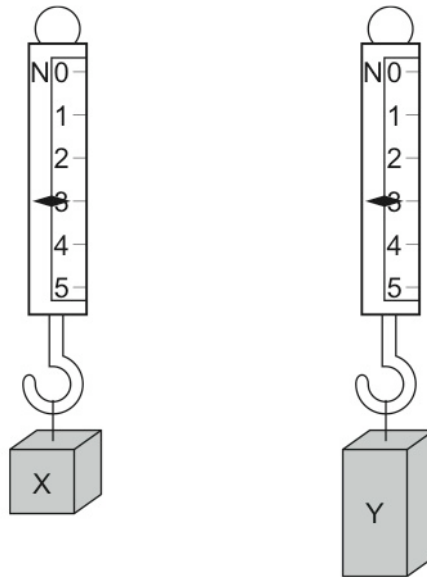
- 19** What is the name of the property of a body which resists a change in its state of rest or uniform motion?

- A** Acceleration              **B** Density                      **C** Inertia                      **D** Velocity

- 20** Which statement correctly describes the mass of an object?

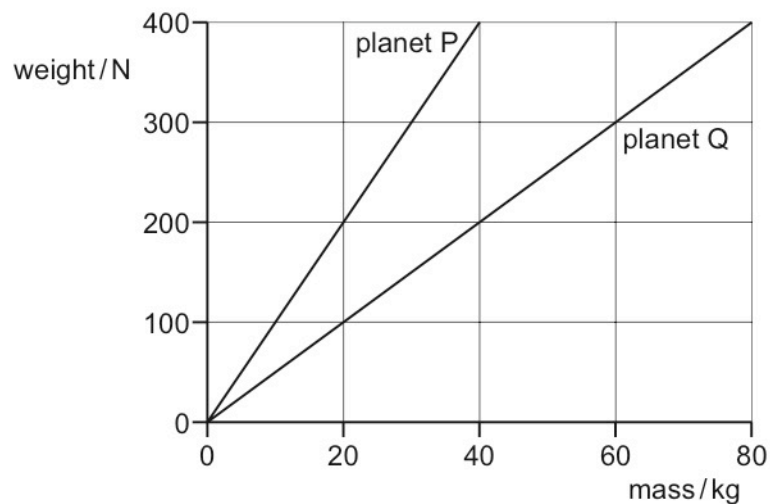
- A** The amount of space taken up by the object.
- B** The amount of substance the object contains.
- C** The material from which the object is made.
- D** The pull of gravity on the object.

- 21 Two blocks of metal **X** and **Y** hang from spring balances as shown in the diagram.



What does the diagram show about **X** and **Y**?

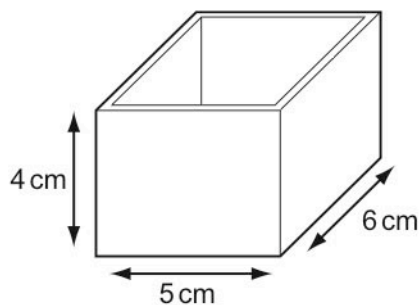
- A** They have the same mass and the same volume but different weights.
  - B** They have the same mass and the same weight but different volumes.
  - C** They have the same mass, the same volume and the same weight.
  - D** They have the same weight and the same volume, but different masses.
- 22 The graph shows how weight varies with mass on planet **P** and on planet **Q**.



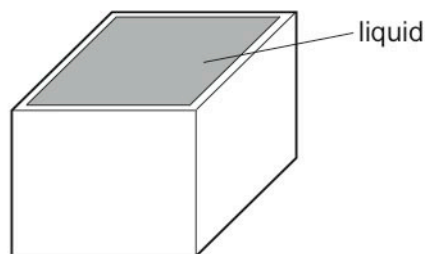
Which of the following statements is true?

- A** Planet **P** has a stronger gravitational field strength.
- B** Planet **Q** has a stronger gravitational field strength.
- C** An object has the same weight on planet **P** and on planet **Q**.
- D** Planet **Q** has twice the gravitational field strength as planet **P**.

- 23** The diagrams show a rectangular box with inside measurements of 5 cm x 6 cm x 4 cm.



**mass = 40 g**



**total mass = 220 g**

The box has a mass of 40 g when empty. When filled with a liquid, it has a total mass of 220 g.

What is the density of the liquid?

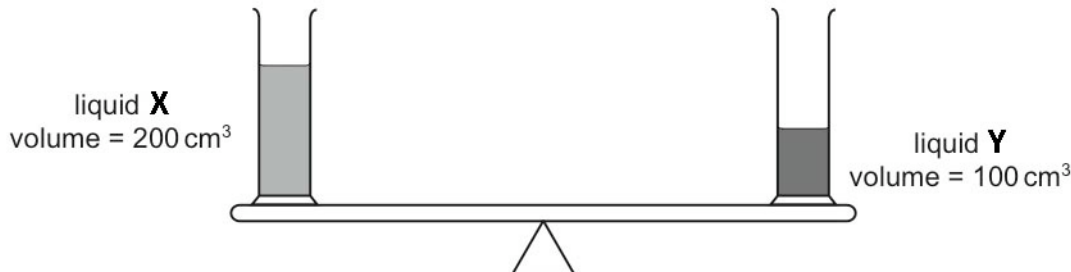
**A**  $\frac{220}{(5 \times 6 \times 4)} \text{ g/cm}^3$

**B**  $\frac{(220 - 40)}{(5 \times 6 \times 4)} \text{ g/cm}^3$

**C**  $\frac{(5 \times 6 \times 4)}{220} \text{ g/cm}^3$

**D**  $\frac{(5 \times 6 \times 4)}{(220 - 40)} \text{ g/cm}^3$

- 24** Two identical measuring cylinders containing different liquids are placed on a simple balance, as shown.



How does the density of **X** compare with the density of **Y**?

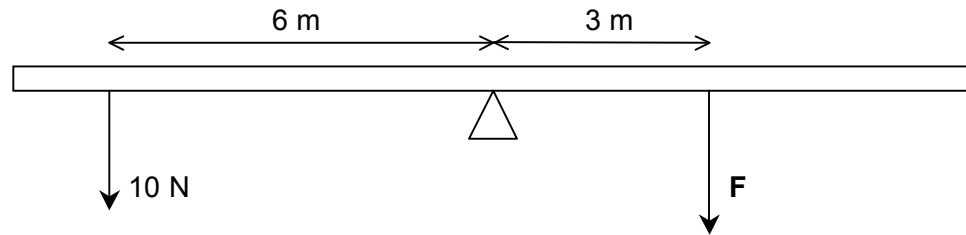
- A** Density of **X** =  $\frac{1}{2}$  x Density of **Y**  
**B** Density of **X** = Density of **Y**  
**C** Density of **X** = 2 x Density of **Y**  
**D** Density of **X** = 4 x Density of **Y**

- 25** If a nut and bolt are difficult to undo, it may be easier to turn the nut by using a longer spanner. This is because the longer spanner gives \_\_\_\_\_.

- A** a larger turning moment  
**B** a smaller turning moment  
**C** less friction  
**D** more friction

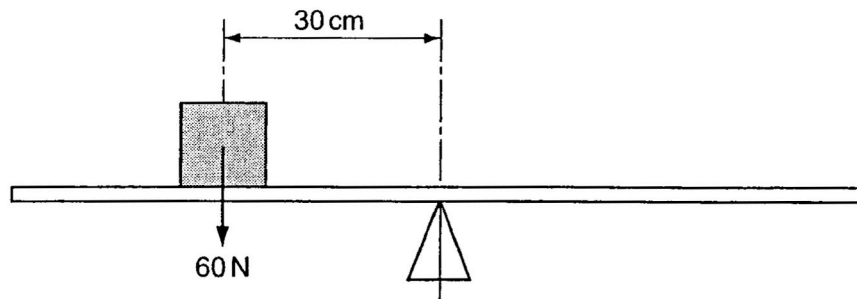


- 26 A force of 10 N acts on a uniform bar, supported on a pivot as shown below.



What is the magnitude of the force,  $F$ , required to balance the bar?

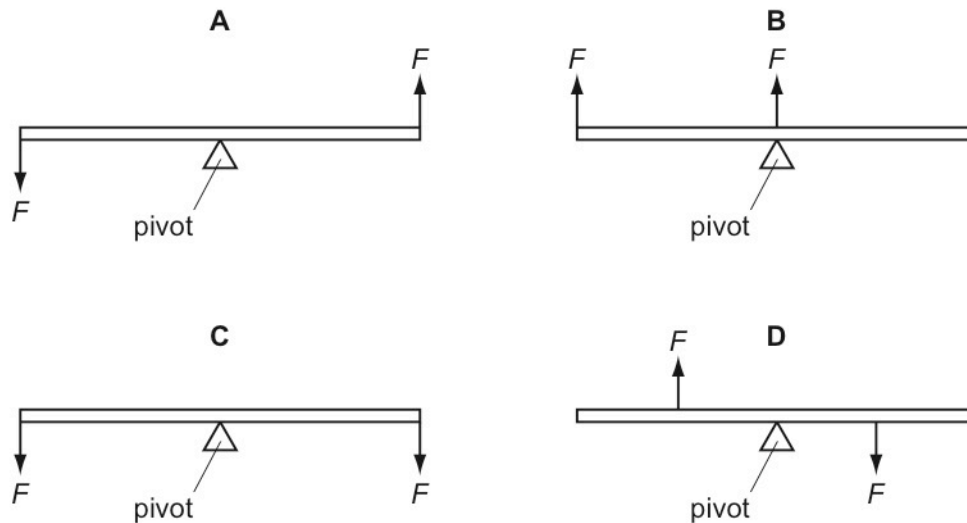
- A 10 N                      B 20 N                      C 30 N                      D 40 N
- 27 A uniform beam is pivoted at its midpoint. An object is placed on the beam as shown.



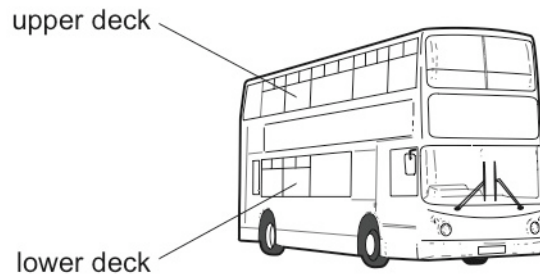
Which force will re-balance the system?

- A 30 N acting upwards, 60 cm to the right of the pivot.  
 B 30 N acting upwards, 60 cm to the left of the pivot.  
 C 45 N acting downwards, 45 cm to the right of the pivot.  
 D 90 N acting downwards, 20 cm to the left of the pivot.
- 28 The diagrams show a uniform rod with its midpoint on a pivot. Two equal forces,  $F$ , are applied to the rod, as shown.

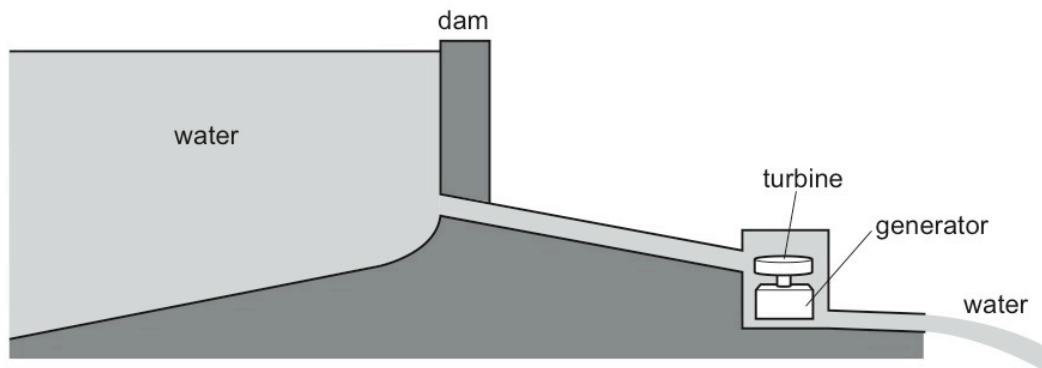
Which diagram demonstrates the Principle of Moments?



- 29 Why are passengers not allowed to stand on the upper deck of double-decker buses?



- A** They would cause the bus to be unstable.  
**B** They would cause the bus to slow down.  
**C** They would increase the kinetic energy of the bus.  
**D** They would lower the centre of gravity of the bus.
- 30 The centre of gravity of an object is slightly disturbed when the object is raised. It then returns to its original position when the disturbing force is removed. This object is said to be in \_\_\_\_\_.
- |          |                      |          |                     |
|----------|----------------------|----------|---------------------|
| <b>A</b> | stable equilibrium   | <b>C</b> | static equilibrium  |
| <b>B</b> | unstable equilibrium | <b>D</b> | neutral equilibrium |
- 31 The diagram shows water stored behind a dam.



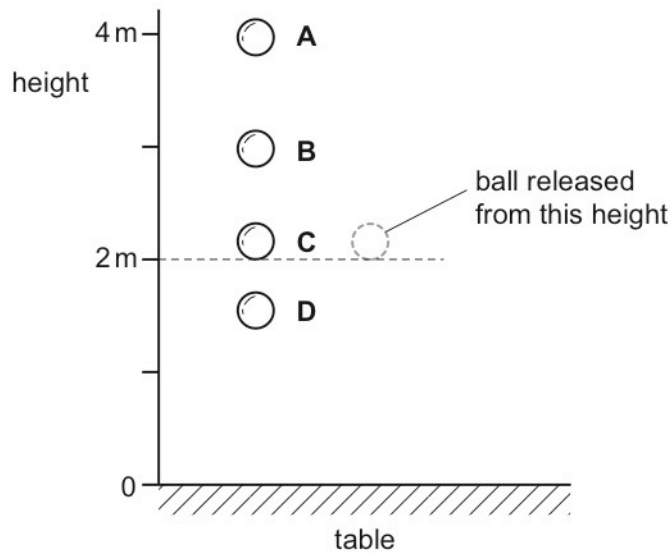
The water flows to a turbine and turns a generator.

Which sequence for the conversion of energy is correct?

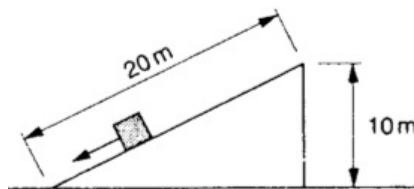
- A** Gravitational potential energy → Kinetic energy → Electrical energy  
**B** Kinetic energy → Gravitational potential energy → Electrical energy  
**C** Gravitational Potential energy → Electrical energy → Kinetic energy  
**D** Kinetic energy → Electrical energy → Gravitational potential energy

- 32** A rubber ball is dropped from a height of 2 m onto a table.

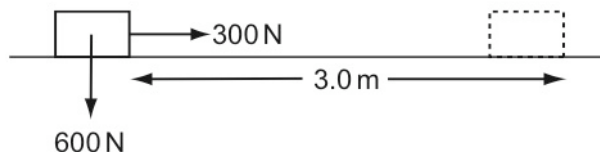
Whilst in contact with the table, some of the energy is converted into internal energy. What is the highest possible height the ball could reach after bouncing off the table?



- 33** A block of mass 2 kg slides from rest through a distance of 20 m down a frictionless slope, as shown. What is the kinetic energy of the block at the bottom of the slope?  
(The acceleration of free falls is  $10 \text{ m/s}^2$ )



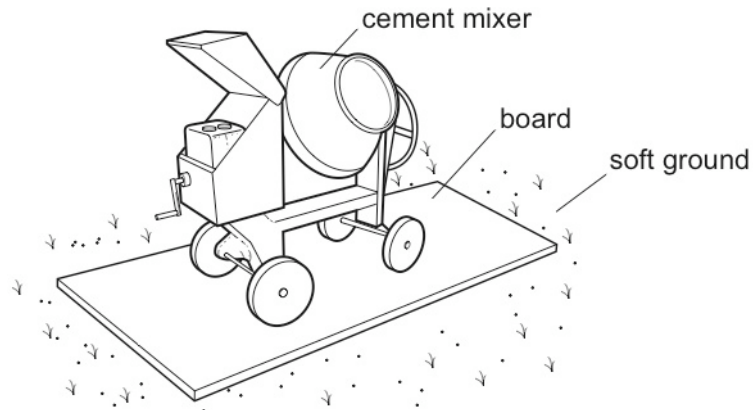
- A** 20 J                      **B** 40 J                      **C** 200 J                      **D** 400 J
- 34** When a 300 N force is applied to a box weighing 600 N, the box moves 3.0 m horizontally in 20 s.



What is the average power produced by the box?

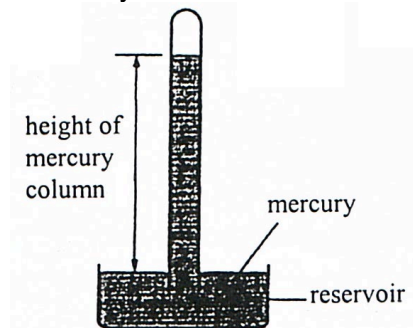
- A** 45 W                      **B** 90 W                      **C** 900 W                      **D** 1800 W

- 35 To prevent a cement mixer from sinking into soft ground, the mixer is placed on a large flat board.



Why does this prevent the mixer from sinking?

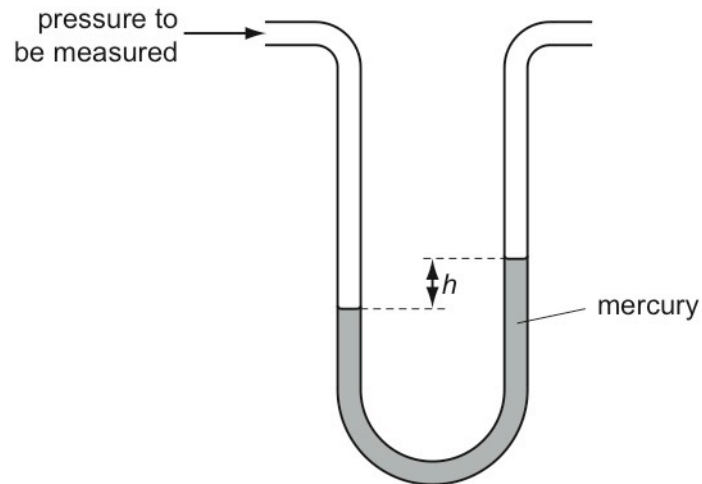
- A The large area decreases the pressure on the ground.
  - B The large area increases the pressure on the ground.
  - C The large area decreases the weight on the ground.
  - D The large area increases the weight on the ground.
- 36 The diagram shows a simple mercury barometer.



Which of the following **does not** cause the height of the mercury column to vary?

- A Changes in the atmospheric pressure.
  - B Changes in the value of  $g$ .
  - C Evaporation of mercury from the barometer reservoir.
  - D Leakage of air into the tube.
- 37 The height of the column of mercury in a simply mercury barometer on a particular day is measured at 75 cm. What is the value of atmospheric pressure?  
(Take  $g = 10 \text{ N/kg}$ , density of mercury =  $13\,600 \text{ kg/m}^3$ )
- A 1 020 Pa      B 10 200 Pa      C 102 000 Pa      D 1 020 000 Pa

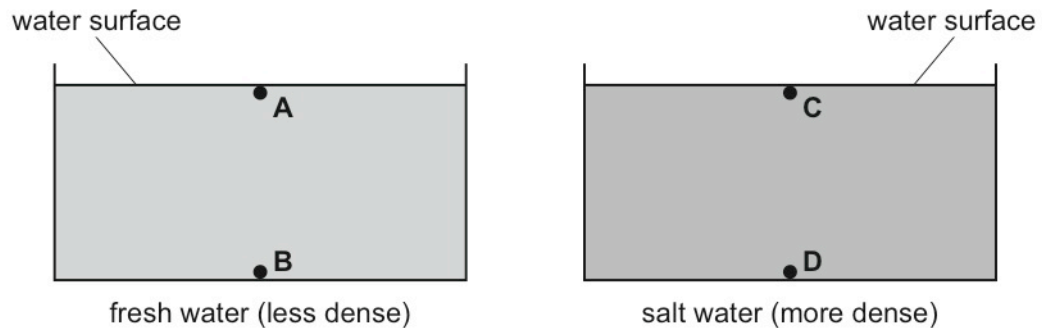
- 38 The pressure of a gas is measured using a manometer as shown in the diagram.



The mercury in the manometer is replaced with a liquid which is less dense.

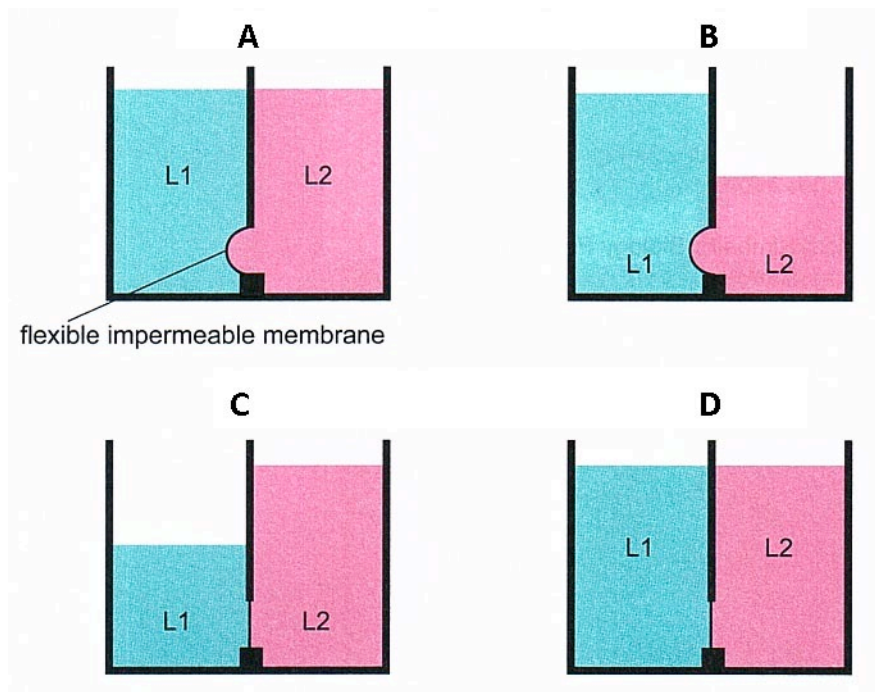
How does the value of  $h$  change?

- A It becomes zero.
  - B It decreases, but not to zero.
  - C It stays the same.
  - D It increases.
- 39 The diagrams show two swimming pools. One contains fresh water and the other contains salt water. Salt water is denser than fresh water.



At which labeled point is the pressure the greatest?

- 40 A student places two liquids in the apparatus as shown . If liquid 1 (L1) has twice the density of liquid 2 (L2), which diagram shows a possible set of results?



**END OF PAPER 1**